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ABSTRACT

A description is presented of the Youth Apprenticeship Demonstration Project in Broome County, New York, which enrolls 25 high school juniors from 5 school systems in newly created apprenticeships in manufacturing and engineering technology, administration and office technology, and health care. Apprentices spend 10-20 hours per week (plus summers in some cases) in supervised work experience with one of four participating employers. In addition to releasing students from school for part of the day, participating high schools give apprentices opportunities to relate their classes directly to work experiences. Successful apprentices will be qualified for employment after high school, but they will also be encouraged to continue their training for another 2 years at Broome Community College in order to qualify for employment at higher levels or to pursue higher education. This report describes the operating principles, the structure of the project, responsibilities of employers and school staff, Cornell University (New York) involvement in the project, institutional cooperation, ideas for designing apprenticeships, manufacturing and engineering technology, administration and office technology, and health care curricula. (KC)

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Creating Apprenticeship Opportunities for Youth

Stephen F. Hamilton • Mary Agnes Hamilton • Benjamin J. Wood

A Progress Report from the Youth
Apprenticeship Demonstration Project
in Broome County, New York

September, 1991

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This report describes a research and development project of the Department of Human Development and Family Studies, College of Human Ecology, Cornell University. Cornell Cooperative Extension of Broome County gives the project its local base. Financial support is provided by a legislative initiative of the New York State Legislature sponsored by Assembly Majority Leader James R. Tallon, Jr.

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Information Form

Youth Apprenticeship Opport

Title: Patient Care

Where? United Health Services Hospitals
33-55 Harrison Street
Johnson City, NY 13790

United Health Services Hospitals (UHS) is the region's largest health care organization providing sophisticated health care services to the people who live in the Twin Tier area. UHS includes Binghamton General Hospital and Wilson Memorial Hospital. It is a non-profit hospital, affiliated with the State University of New York at Syracuse, keeping it abreast of and health professionals informed of the latest advances in medical science and technology.

UHS is the second largest employer in Broome County, with more than 2,700 employees. UHS has more than 650 different occupations in support services, medical and clerical support, nursing, technical and other professional occupations and i

Time? During the fall and spring semesters, apprentices will report to their assigned local high school days for ten to twelve hours per week. Part-time or full-time employment is an option during the summer after junior year.

How do you apply?

What would you do?

Youth apprentices in Patient Care will be trained in two departments of the hospital: patient phlebotomy laboratory and physical therapy. The youth will spend six months in each of the departments during the first year. Apprentices will choose a specialization for the second year.

What will you learn?

Youth apprentices will learn to perform and assist in such procedures as patient intake, phlebotomy, and physical therapy. They will learn the reasons for these procedures and place in a broader treatment program. In addition, they will acquire more general skills in communication, problem solving, and team work. Youth will also learn more about their options for careers in patient care.

Introduction

Teenagers like to work. Jobs give them money and the satisfaction of doing something worthwhile. Employers need workers who are well educated, diligent, and flexible, but they complain that most applicants do not meet their standards. Many young people fail to gain the qualifications for skilled jobs with good pay because their part-time work experience has taught them that school is irrelevant to the world of work.

The Youth Apprenticeship Demonstration Project¹ in Broome County, New York, was created to help high school students see direct connections between school learning and paid employment. Apprentices are simultaneously workers and learners. In order to gain job-related competence, they must acquire academic knowledge and skills. Participating employers cooperate with schools to provide a challenging education and training experience, which assures them of a high quality workforce.

Twenty-five juniors are enrolling in the fall of 1991 in newly created apprenticeships in manufacturing and engineering technology, administration and office technology, and health care. They will spend ten to twenty hours per week (plus summers full-time in some cases) in supervised work experience with one of four participating employers: Security Mutual Life Insurance, United Health Services Hospitals, Raymond Corporation, and Lourdes Hospital. Five school systems will be involved in the project: Binghamton, Susquehanna Valley, Union-Endicott, Whitney Point, and Greene. (Raymond Corporation is located just outside Broome county in the village of Greene.) In addition to releasing students from school for part of the day, participating high schools will give apprentices opportunities to relate their academic

classes directly to their work experience, for example by assigning special projects.

Successful apprentices will be qualified for employment following high school graduation, but they will also be encouraged to continue their training for another two years while enrolled in Broome Community College in order to qualify for employment at higher levels (for example, as technicians). They will also be eligible to enroll in higher education full-time if they choose.

In this report we will describe the design and structure of the apprenticeship project and the roles of project participants. We have laid the groundwork, but the successful operation of the Youth Apprenticeship Demonstration Project is only the first step. We hope ultimately to create not just a program, but a system. Systems have a place for everyone. They have clear paths within them that give participants a sense of how to move from one point to another. And systems are interconnected—in this case with the school system, families, and the labor market. The documented success of traditional apprenticeship in the United States and Europe and of similar programs such as cooperative education proves that this approach works; that is not the question. What we need to know is how to make it possible for a substantial portion of the youth population to enjoy the advantages of apprenticeship. That entails inventing a system, not just a program.

¹ The project is based in part on research done in Germany, where apprenticeship is the primary form of upper secondary education. The rationale for this project is set out in detail in *Apprenticeship for Adulthood: Preparing Youth for the Future* (New York: Free Press, 1990) by the project director, Stephen F. Hamilton. Further research was done on teaching and learning in U.S. workplaces to guide the project's development. In addition, the project director has made study trips to Austria, Switzerland, Denmark, and Sweden to learn about variations and alternatives to the German system. This knowledge has also been incorporated into the demonstration project's design.

Operating Principles

The following principles guided the design of the project. We will be testing and refining them as the project proceeds.

1. Apprenticeships structure learning through work.

The employers, the schools, and Cornell University will develop a "curriculum" for both school-based and work-based learning opportunities. Both academic and job-related competencies will be enhanced by the work experience. Employers will designate people in the workplace as training directors, area coordinators, coaches, and mentors. Schools will adapt instruction to take maximum advantage of an apprentice's work experience.

2. Youth apprenticeship is potentially appropriate for anyone.

Young people who do not expect to enroll in four-year colleges have the most to gain from apprenticeships, but college-bound students are not excluded. Youth apprenticeship is not aimed primarily at students with serious problems. Apprenticeship opportunities can be strong deterrents to adolescent problem behavior, but in order for apprenticeship to become an effective form of education and training, it must appeal to and serve a wide range of young people, not just those labeled "at risk."

3. Apprentices are employees.

Apprentices are hired, paid, supervised, and, if necessary, dismissed according to explicit policies. The terms of employment, mutual obligations, and training opportunities are spelled out in a contract signed by the apprentice, parents, and the employer. If an apprentice is dissatisfied with a position or if an employer is unhappy with

an apprentice's performance, every effort will be made to improve the situation to their mutual satisfaction.

The special conditions of youth apprenticeship include part-time status, opportunities to learn, and special support for learning, both directly from the employer and indirectly from the school and apprenticeship program staff.

4. Apprenticeships are organized by career areas, not specific jobs.

In each of the three areas we have focused on (manufacturing and engineering technology, administration and office technology, and health care), apprentices will be trained in a broad range of skills and expected to perform many tasks. Instead of being trained narrowly for one job, they will be "cross-trained" by means of systematic rotation through several jobs. Specialized preparation for particular jobs will be postponed as long as possible. In all occupations the emphasis will be on broad and widely applicable knowledge and skills.

5. Apprenticeships will give young people academic diplomas as well as job certification.

Participating schools will award diplomas according to their ordinary procedures and based on the same standards that apply to other students.

Initially, successful apprentices will be certified as skilled workers by their employers. Eventually, we will explore the registration of apprenticeships with the New York State Department of Labor so that certification will be recognized by all employers.

6. The apprenticeship project is a Cornell University research and development project.

This project has been funded and designed as a research and development project to determine how to create an apprenticeship program for high school students. The focus of the research is on how to structure teaching and learning in the workplace and how to relate work experience to school.

Creating a Structure

The structure of the demonstration project is defined by the roles and responsibilities of participating organizations and individuals and by the lines of communication among them. Schools and firms have gone through similar stages in their involvement in the project.

Stages of Employer Involvement

Our work with employers to develop apprenticeships has typically proceeded through the following six stages, each containing distinct tasks to be completed before we could advance to the next.

1. Securing commitment

During initial contacts with potential employers, Cornell staff members clarified the principles underlying the project. In many cases this process lasted several months and required repeated contacts while the firm considered such issues as federal and state health and safety regulations, compensation, selection procedures, and the form that apprenticeship at their firm might take. At this point the firm also sought approval from different levels of management, perhaps also from a board

of directors and a CEO. The employers committed to the project by stating the number of apprentices they could train for a certain number of hours per week.

2. Identifying potential positions

The employer and the Cornell team then began to develop actual apprenticeships. First, the human resources staff and/or the Cornell team explained the apprenticeship program to department heads, managers, and supervisors who expressed an interest in working with apprentices. After tentatively agreeing to participate, these individuals suggested positions within their work areas that might be suited for technician-level apprenticeships.

3. Analyzing potential positions

Job descriptions in a department or area were a starting point for this step. Someone from Cornell also visited the work sites to observe firsthand the learning opportunities available to employees in those positions and to understand better the activities those employees engaged in. We also conducted interviews and discussions about those activities and positions.

4. Grouping positions

After the workplace observations and interviews, Cornell and the employer (a) clustered jobs with overlapping activities and competencies that comprehend broad training opportunities, (b) identified a common core in diverse jobs in order to postpone specialization, (c) added "new workplace basics" and anticipated future demands that might relate to technology and workplace organization, and finally (d) prepared announcements describing specific apprenticeships as a tool for recruiting applicants.

5. Defining competencies

In conjunction with proposing an apprenticeship, the employer and the Cornell project members determined the activities an apprentice might engage in during the first year and thereafter. Cornell provided a general listing of competencies based on our earlier research on teaching and learning in the workplace. The managers and supervisors used this listing to specify competencies needed to execute particular activities as well as overlapping competencies among departments. The listing was not intended to be inclusive; rather, it was a tool to begin dialogue about the teaching and learning that will be structured into the daily activities of the apprentices.

6. Determining curriculum

The workplace teachers have a crucial role in apprenticeships, as outlined below.

Each employer was asked to designate a *training director*. This person, usually in the human resources department, is the key contact in the firm. She or he designs the training program and communicates with area coordinators to ensure continuity as the apprentices rotate through different areas of a firm. Training directors oversee the apprentice's total program.

In each area, department, or unit through which the apprentices rotate, there will be an *area coordinator*, usually the manager or supervisor. Area coordinators arrange for coaches to work with the apprentices and oversee the apprentices' time in their area.

Coaches develop the competencies of the apprentices. They instruct, demonstrate, explain, critique, think out loud, challenge, and affirm the apprentices as they carry out their activities.

A *mentor* may be located in any part of the firm. Initially an apprentice will be matched with a mentor but he or she may later choose another mentor after meeting more people in the firm. The mentor will counsel the apprentice about career directions and life goals and will initiate him or her into the norms of the workplace and its culture.



Employer Team Responsibilities

Training Director: Manage the firm's apprenticeship program.

1. Design apprenticeships with area coordinators.
2. Select apprentices with area coordinators.
3. Arrange apprentices' program with area coordinators.
4. Maintain apprentices' records and evaluate apprentices' progress.
5. Serve as a contact to schools and parents.
6. Participate in training mentors, coaches, and area coordinators.
7. Facilitate Cornell research.

Area Coordinators: Supervise apprentices in area.

1. Determine activities and competencies in area.
2. Assign coaches for activities.
3. Evaluate competency development in area.
4. Maintain contact with other area coordinators and training director to coordinate program.
5. Serve as a contact to classroom teachers and guidance counselors.

Coaches: Teach apprentices.

1. Teach apprentices competencies on the job.
 - Instruct the learner in how to perform a task.
 - Demonstrate how to perform a task.
 - Explain why a task is performed a certain way.
 - Critique the learner's performance.
 - Think out loud in order to model reasoning process for the learner.
 - Challenge the learner to perform well.
 - Affirm the learner's value as a person and talent as a worker.
2. Serve as a contact to classroom teachers.

Mentors: Advise apprentices.

1. Counsel youth apprentices about career directions.
 2. Initiate youth apprentices to the culture of the workplace.
 3. Serve as a contact to parents and schools.
-

Stages of School Involvement

A school's involvement in the youth apprenticeship project has generally followed five stages.

1. Securing commitment

Superintendents, principals, and school boards had to approve the project's purposes, principles, and procedures and agree to take part before serious planning could take place. When commitment had been made, an *apprenticeship coordinator* (for example, a guidance counselor, assistant principal, or department head) was identified in the high school to handle communications and facilitate further planning.

2. Negotiating participation

The project must have support not only from the top but also from those who will be dealing directly with apprentices: teachers, counselors, and parents. Principals were asked to present the project to teachers. The most interested and committed teachers were identified so that they could be involved in further activities. When teacher support had been secured, an informational meeting was held for students and parents.

3. Publicizing apprenticeships

Although many students expressed strong interest in becoming apprentices after being introduced to the program, serious recruitment began with the employers' announcements of specific apprenticeship opportunities. One-page announcements were posted in the schools and apprenticeship coordinators sought out appropriate students to give them the information.

4. Recruiting students

Students' applications were screened initially by an in-school committee, then by the project's steering committee. Employers received applications from students who met their criteria and belonged to the project's target group. Before applying, students learned about career prospects and prepared for interviews; some of them toured workplaces. Employers made the final selection because the apprentices will be their employees.

5. Developing curriculum

This stage corresponds to the sixth stage of employer participation. During 1991-92, the project will not be making heavy demands on participating schools to adapt their instructional programs to meet apprentices' needs. Small numbers of apprentices in each school and the diversity of their work placements make such adaptation uneconomical. Guidance counselors will arrange apprentices' school schedules for released time. And many teachers are willing to give apprentices enrolled in their classes special assignments based on their work experiences. As described above, there will be many points where teachers and workplace coaches will both be involved in apprentices' learning. As the program grows it will become feasible to consider organizing classes specifically for apprentices and arranging senior projects supervised jointly by people in the firm and school.

In the fall, in-school committees will take charge of coordinating the program—recruiting and screening students, fostering understanding, and assisting with curriculum development. These groups will also encourage relationships with participating businesses and will further strengthen communication among schools, businesses, and parents.

School Team Responsibilities

Apprenticeship Coordinator: Manage the school's apprenticeship program.

1. Recruit applicants for apprenticeships.
2. Serve as a contact for firms, parents, and apprentices.
3. Coordinate an in-school committee of employers, parents, school staff, and youth.
4. Facilitate Cornell research.

Teachers: Develop school-based curricula that build on work experience.

1. Observe and interview apprentices, coaches, mentors, and coordinators at firms.
2. Structure courses that enhance work-based experiences: interdisciplinary courses, special topics within existing courses, senior year projects with school and firm advisers.

Guidance Counselors: Advise individual students.

1. Arrange apprentices' school schedules for released time.
 2. Advise apprentices, their parents, and their teachers.
-

Cornell University's Role in Apprenticeship Development

Cornell University, including Cornell Cooperative Extension in Broome County, is developing the project for research and demonstration purposes. Cornell staff are engaged in research, program development, and program operation. Although these functions can be distinguished, the same people often perform more than

one. Cornell took the lead in developing and operating this project for research and development purposes, and Cornell Cooperative Extension gave it a base in Broome County. If the project grows as planned, however, it will exceed the capacity and the mandate of Cornell Cooperative Extension. At that point, another organization will have to take over program operation.

Cornell Team Responsibilities

Research Staff: Conduct apprenticeship research.

1. Document and analyze the implementation process.
2. Document and analyze the roles of apprentices and team members.
3. Assess program impacts on youth, teams, and institutions.
4. Report findings to participants and a national audience.

Development Staff: Develop apprenticeship programs and system.

1. Consult with employer teams and school teams to
 - design programs
 - solve problems
 - share information
 - develop curriculum
 - develop team training
 - develop school committees
2. Recruit new employers and support apprenticeship development.

Operations Staff: Maintain apprenticeship project.

1. Convene the project steering committee.
 2. Coordinate recruiting of youth.
 3. Provide public information.
 4. Implement curriculum for apprentices.
 5. Conduct training for employer teams and school teams.
-

Institutional Linkages

For apprenticeship to succeed, it needs to have an institutional base and to be linked to all the institutions where the apprentices spend time.

Institutional Base

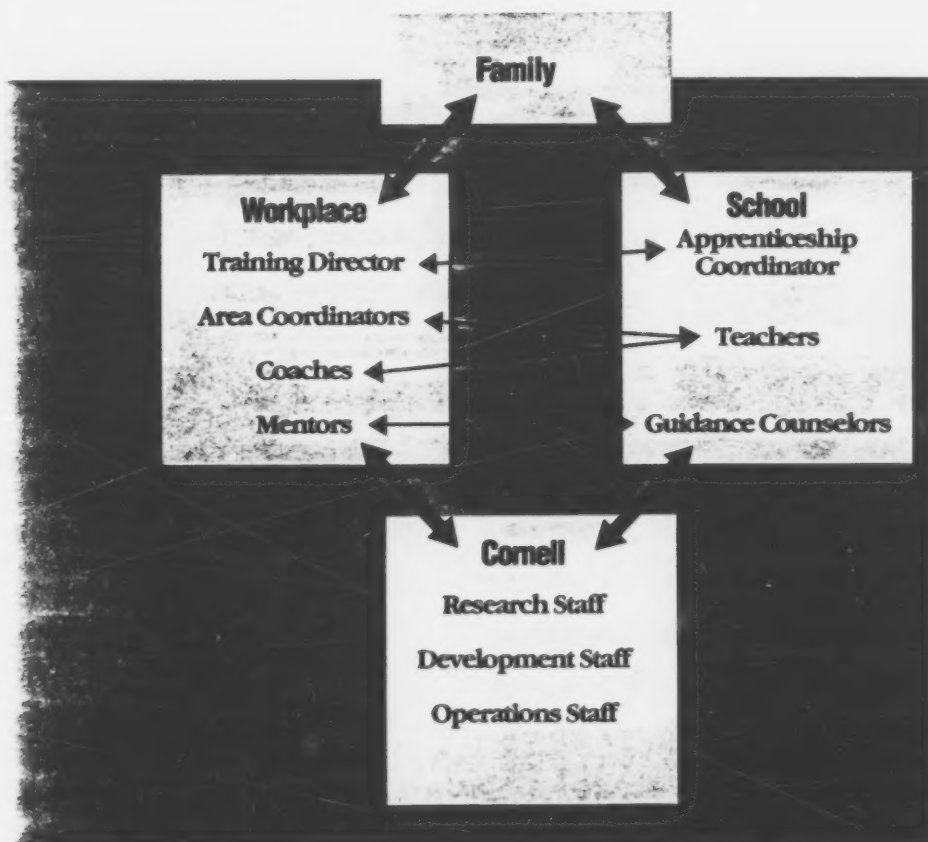
Community support, as described below, was critical to initiating the demonstration project, but developing a system entails finding or creating an enduring institution to carry out the system's functions and coordinate the activities of related organi-

zations. Ideally, such an institution would stand between schools and employers. Identifying such an institution and nurturing its capacity to assume responsibility for creating and maintaining apprenticeships are vital to the long-term plan.

School, Workplace, and Family Linkages

Communication channels need to be established among the major institutions where the apprentices will spend time (see fig. 1).

Figure 1. **Primary Communication Channels**



Community Support

A project this complex requires widespread support. We have built this support by communicating freely and by involving a network of organizations and programs in planning and carrying out the project's operating principles. Organizations involved in education, labor, and business were informed about and asked to participate in the project by means of personal and group orientation. A countywide steering committee designed to assist in the development and implementation of the project was crucial to our networking efforts. Its members represent the Broome-Tioga School and Business Alliance (SABA), Broome-Tioga BOCES, the New York State Department of Labor, Southern Tier Regional Educational Center for Economic Development, Broome Community College, the International Brotherhood of Electrical Workers, and several other businesses and schools.

The steering committee has reviewed project plans, designed and conducted applicant screening procedures, and participated in career education workshops. Each member has served as an ambassador for the project to the community. This arrangement has enhanced our ability to communicate the intentions and details of the project throughout the community.

Networking has been particularly effective with the School and Business Alliance and Broome Community College. SABA has played a major role in developing career education for the apprentices and will continue to prepare groups of students for apprenticeship. Broome Community College has assisted in designing curricula that will qualify apprentices for admission to college upon completion of their first two years of apprenticeship.

Without strong support from the community beyond the participating

schools and businesses, the project could not have had a successful start. Continued support is clearly needed so that it may expand in the future.

Designing Apprenticeships

The key challenge in designing an apprenticeship is to identify specific work tasks that an inexperienced youth can perform and that will contribute to her or his acquisition of workplace competence. Competence in the workplace is based on the following elements:

1. **Procedures:** Following steps to accomplish a task.
2. **Rules:** Adhering to professional norms.
3. **Principles:** Understanding the scientific principles underlying certain procedures.
4. **Systems:** Understanding the organizational context.
5. **Communication:** Using written and spoken language to give and receive clear messages.
6. **Computer use:** Using computer technology efficiently and effectively.
7. **Thinking:** Analyzing, using judgment, and solving problems.
8. **Initiative:** Acting independently when appropriate and taking responsibility for one's own learning.
9. **Teamwork:** Cooperating with others and taking a variety of roles in the work group, including leader.
10. **Commitment to excellence:** Committing to the highest standards of practice and to continuous improvement.

An apprenticeship should initially be rather broad to enable a young person to take more than one career path, delaying specialization until she or he has more experience, a clearer idea of career prospects, and greater maturity.

Although participating employers agreed with those aspirations, many of their current jobs were defined much more narrowly. In some cases—health care is the most striking example—current job

descriptions were codified in quite detailed licensing requirements. When only a few departments or areas chose to participate in the project, special attention was needed to ensure that competencies would relate to general areas as well as to the particular procedures of a department.

Following table 1 are brief descriptions of the apprenticeships that have been created for the first year.

Table 1. **Apprenticeships in Broome County, New York**
September, 1991

<i>Occupational Area</i>	<i>Firm</i>	<i>Apprentices</i>
Manufacturing & Engineering Technology	Raymond	3
	Raymond	3
Administration & Office Technology	Security Mutual	4
Health Care	Lourdes	5
	UHS	10
Total Apprentices		25

Manufacturing and Engineering Technology

Three students will enter manufacturing and engineering technology apprenticeships at Raymond Corporation. They will be trained to perform activities of increasing complexity by rotation through fabrication, product finishing, and electrical subassembly. They will operate machinery, follow inspection procedures, complete paperwork, and learn the basic operations in each area. Each apprentice may specialize in a selected area upon successful completion of the initial rotation.

After high school, an apprentice may qualify as a production operator. But should an apprentice continue with two years of community college, she or he will be able to pursue a career in one of numerous technician-level positions: electrical, laboratory, manufacturing, facilities, and production. An apprentice may also enroll in a four-year engineering program.

Administration and Office Technology

Seven youth apprentices will train in administrative office management at two firms. Their training will qualify them for positions as clerks or secretaries after two years. With two more years of apprenticeship and community college, they will be able to attain a technical position at Security Mutual Life Insurance, such as illustrator, accountant, computer programmer, or case controller. Further higher education could lead to positions as underwriters or actuarial assistants. During the first year, apprentices at the insurance firm will gain an overview of insurance company operations by rotating through the following departments: marketing, group insurance, pensions administration, new business, and agency administration.

Administrative apprentices at Raymond Corporation will rotate through three areas: human resources, finance, and operations. After two years of community college they can become executive secretaries, systems analysts, human resources administrators, or accountants, among additional possibilities. After four years of college, students may choose careers as accountants, human resources specialists, or systems administrators.

Health Care

Approximately fifteen apprenticeships are being developed in health care at United Health Services Hospitals (UHS) and Lourdes Hospital. Youth apprentices will enroll in one of three fields: patient care, biomedical technology, or administration and office technology. The last is similar in some respects to the administration and office technology apprenticeships described above; however, apprentices acquire specialized knowledge related to health care. For example, apprentices in

medical records may qualify as medical records assistants or medical office assistants after high school. Two years at a community college could lead them toward positions as medical records technicians. With further higher education, they could become medical records administrators or staff accountants.

The finance department at UHS has opened its doors to youth apprentices, planning rotations through general accounting and cash management. The youth apprentices will become familiar with basic accounting and cash flow accounting. Staff accountant trainee and staff accountant are career paths they might enter.

Ten students will enter patient care apprenticeships. During the first year, six of them will train in two departments at UHS—outpatient phlebotomy laboratory, and physical therapy and sports medicine. After graduating from high school, these apprentices may be eligible for scholarships to obtain training as technicians or nurses. Physical therapy offers additional career paths. At Lourdes Hospital four apprentices will enter patient care. Two will rotate through three departments in the anatomical laboratory during their first year. They may enter career paths that lead to technician-level jobs in histology or in other labs. After four years of college they may be able to qualify as medical technologists or pathology assistants. The other two apprentices will enter nursing care.

One apprentice will be trained in biomedical technology to service the biomedical hospital equipment. He or she may qualify as a biomedical service technician after two years of community college. Apprentices in this area may choose to specialize further as radiology repair technicians, laser technicians, or service representatives for vendors.

Toward a System of Apprenticeship: Plans for the Coming Year

As we work in the coming year toward building a system of apprenticeship, we will be concentrating on the following tasks: developing and refining the curriculum for apprentices; training employers and school staff; creating systemic links between employers, schools, apprentices, and their parents; and conducting research to inform our project development.

Curriculum Development

To develop curriculum, we will concentrate on describing activities the apprentices perform, illustrating the competencies that students attain through the activities, and defining the roles of coaches, schoolteachers, and apprentices during this process.

Workplace Competence

Apprentices' activities will be organized around the competencies identified for their occupational area. Training directors and area coordinators will be responsible for outlining those activities. Coaches will keep track of each apprentice's progress during a specific work assignment.

Apprentices' Notebooks

Apprentices will keep notebooks that include their competency checklist, a weekly record of their activities, copies of their area coordinators' and coaches' reviews of their performance, and monthly written assignments given by their area coordinators and teachers. These notebooks will document their progress and stimulate their critical reflection on the experience.

Senior Project

During their second year, apprentices will work in a group or individually on senior projects related to their work environment. An area coordinator from the workplace and a teacher from their school will approve and evaluate the projects. In addition to using written sources, apprentices will recruit consultants from their firm and school to help them research their topics. At the end of the year they will present their reports in front of a panel of experts from firms and teachers from the school. Parents will also be invited.

Rotations

The rotations need to be further developed. Questions remain about how apprentices will gain advanced competencies, how firms will structure specializations, and how programs in some areas can be broadened by involving more departments within a firm. As the specializations develop, communication will have to increase with Broome Community College, to ensure close articulation.

School-based Instruction

One of the purposes of the Youth Apprenticeship Demonstration Project is to integrate work-based learning into the school curriculum. Although the project will initially have little impact on participating schools, as the number of apprentices increases, teachers, curriculum coordinators, and department chairs must be involved in planning classroom studies. The in-school committees described above will play a key role. Working with the project's steering committee and the state education department, they will help design and implement curricular changes.

Practices that are only possible on an individualized basis with a few apprentices can be institutionalized as

the program grows. Just as in traditional vocational education, apprentices will be able to take courses in school for credit that have immediate application in their workplaces, such as applied science and math courses.

Even in less applied courses, teachers will be able to take advantage of apprentices' workplace experiences for the benefit of all students. For example, a student trying to solve a problem at work that involves mathematics could present the problem to the whole class for everyone to work on. In addition to receiving some help in solving the problem, the apprentice would thereby help the teacher demonstrate to other students the application of mathematical principles and procedures. In addition, workplaces yield vivid examples of the need for young people to learn teamwork, decision making, and problem solving.

Aside from its impact on curricular content, the prospect of enrolling substantial numbers of young people as apprentices raises questions about the structure of the school day and the organization and location of school courses. Some might be more efficiently held in workplaces or in a central location for apprentices from several schools. In the coming year, everyone involved in the project will be carefully considering these issues.

Training

We are making plans for program development and training with employers and school staff. A general outline of needs has been sketched for all sites and will be adapted as necessary. At first training will focus on understanding the program and roles of training directors, area coordinators, mentors, coaches, and school staff. During the second semester of the school year training will enable people to create networks with persons in similar roles outside their institutions. Teachers will observe apprentices and coaches to understand how teaching and learning occur and how academic knowledge is applied in the workplace.

Research

The central questions of our research are (1) What are the elements of youth apprenticeship in the United States? (2) How can we implement an apprenticeship program? and (3) How do apprentices learn on the job?

We will answer the first two questions primarily by documenting and analyzing the program development process. Answering the third question will entail some additional data collection.

We will interview apprentices at the beginning and end of the first year to elicit their expectations, descriptions, and evaluations of their experiences. We will also use school records, notebook entries, and coaches' assessments and will administer some paper-and-pencil measures of apprentices' attitudes, reasoning, and social relations.

We will also ask coaches, training directors, teachers, and parents for their reactions to the project. In addition, we will observe apprentices in their workplaces, accompanied when appropriate by spontaneous questioning. In some cases we will videotape these observations for detailed analysis and for possible use in training.

There is an element of evaluation in this research design; we are concerned in part with how the apprenticeship program operates and what its effects are. A standard outcome evaluation design, however, would be premature. The program must have time to evolve before it is put to any definitive tests based on measures of impact on participants. Measured outcomes are not necessarily the most important or most helpful products of research at this stage. Furthermore, the selection of outcomes and measures should be guided by research that remains to be done.

Rather than evaluation, a more appropriate characterization of our research is captured by the German term *wissenschaftliche Begleitung*, "scientific accompaniment." The study will be conducted in conjunction with program development—not as the decisive test of the program's worth, but as a systematic means of enhancing our understanding of the program's progress and prospects. In addition to being immediately useful for refining our own project, results will help others engaged in related efforts. Ultimately this line of research will also illuminate general issues of adolescent development in the context of employment.

To learn more about our apprenticeship program, please contact the Youth Apprenticeship Demonstration Project, Department of Human Development and Family Studies, Martha Van Rensselaer Hall, Cornell University, Ithaca, New York 14853. Phone: (607) 255-8394 Fax: (607) 255-9856.

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